

Technical Advisory Committee Meeting
2014 RI/FS Summary
Leviathan Mine Site, Alpine County, California
20 January 2015



Presentation Outline

Documents Update

National Historic Preservation Act

RI/FS Field Activities

Status of RI Data Collection

Moving Forward in 2015

RI Work Plans

On-Property FRI Work Plan

Off-Property Area FRI Work Plan

Reference Area FRI Work Plan

Human Health Risk Assessment Work Plan

Ecological Risk Assessment Work Plan

2014 RI/FS Documents

On-Property FRI Work Plan

- ▶ Modifications to Surface Water Monitoring Program – June
- ▶ Amendment No. 6 Revision No. 1 – Characterization of Mine Waste Using FPXRF Screening Survey – June
- ▶ Amendment No. 6 Revision No.1 – Task Sampling and Analysis Plan for Phase 2 Mine Waste Characterization – October
- ▶ Amendment No. 8 – Detailed Stream Sediment and Floodplain Soil Investigations – October
- ▶ Amendment No. 9 – Beaver Pond Surface Water Monitoring – September
- ▶ Amendment No. 10 – Stream Sediment and Floodplain Soil Characterization in Beaver Dam/Pond Complex in On-Property Reach of Leviathan Creek – September

2014 RI/FS Documents

Off-Property Area FRI Work Plan

- ▶ Modifications to Surface Water Monitoring Program – June
- ▶ Revised Addendum No. 2, Amendment No. 1 – Confirmation Sampling of Age-Category 3 Floodplain Soil – June

Reference Area FRI Work Plan

- ▶ Revised Reference Area FRI Work Plan (in progress)

River Ranch SSA (Off-Property and Reference Area FRI Work Plans)

- ▶ Revised/Accelerated River Ranch Soil Investigation Approach – August 2014
- ▶ Task Sampling and Analysis Plan for Irrigation System and Soil Mapping – October 2014

2014 RI/FS Documents

RI Data Submittals

- ▶ 2012 RI/FS Data Summary Report – January
- ▶ 2012 Update to Leviathan Project Data Base – May
- ▶ Interim 2012-2013 Report for Upper Tributary Area Subsurface Flow Barrier Treatability Study, Revision 1 – July
- ▶ Evaluation of Historical and RI/FS Surface Water Data – October
- ▶ 2013 RI/FS Data Summary Report – October
- ▶ 2013 Update to Leviathan Project Data Base – October

2014 RI/FS Document Status

Human Health Risk Assessment Work Plan

- ▶ Resource Walk – results used to develop plant sampling approach

Ecological Risk Assessment Work Plan

- ▶ Problem Formulation Updated Table 2 – April
- ▶ Revised ERA Work Plan – in progress

FS Work Plans and Reports

- ▶ Interim Combined AD Treatability Investigation Work Plan - March
- ▶ Leviathan Mine Site Feasibility Study Approach – August
- ▶ Interim Combined AD Treatability Investigation Work Plan Amendment No. 2014-01 - September
- ▶ Interim Combined AD Treatability Investigation Report and Recommendations – in progress

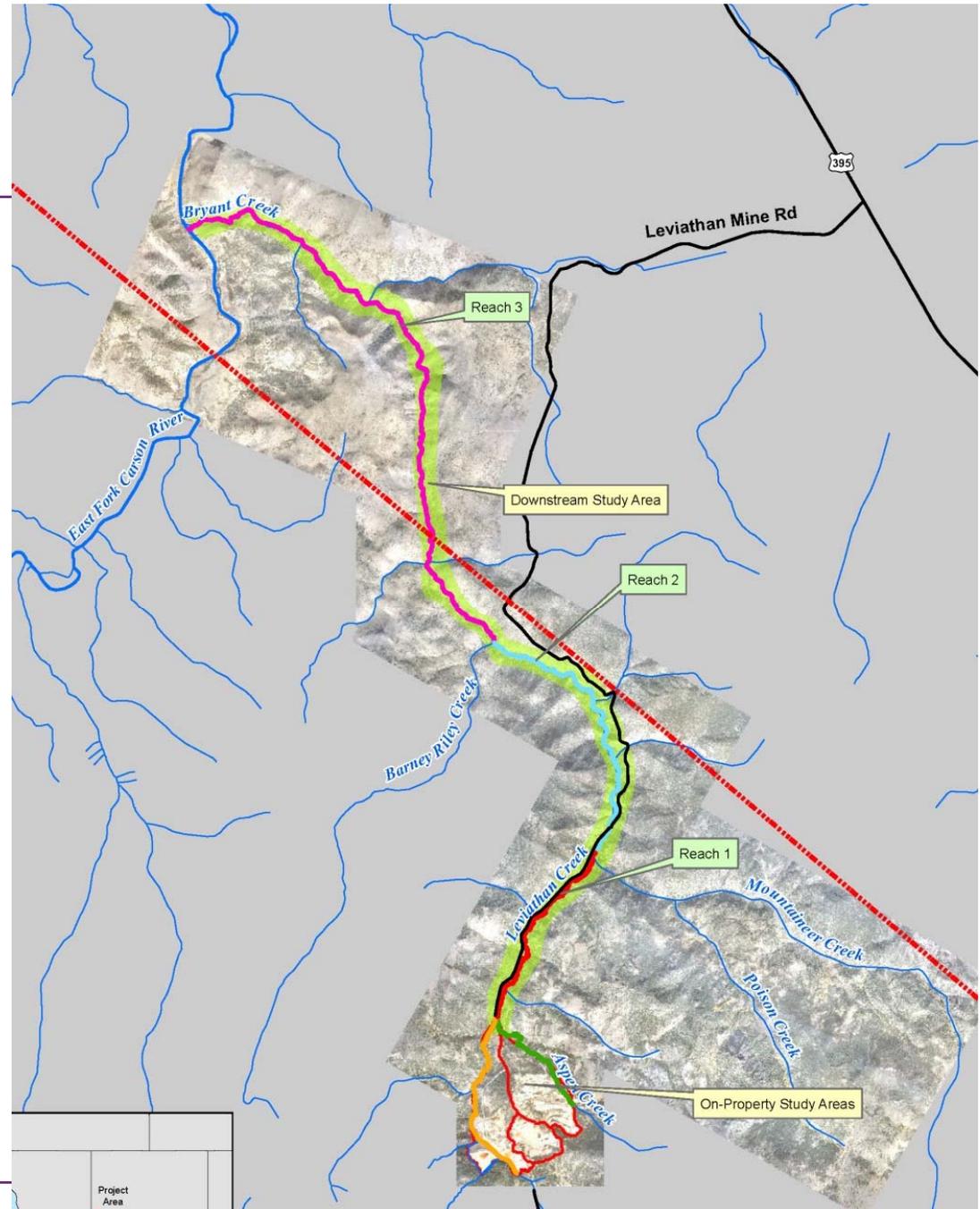
Study Areas

On-Property

- ▶ Leviathan Creek Study Area
- ▶ Pit Study Area
- ▶ Aspen Creek Study Area

Off-Property

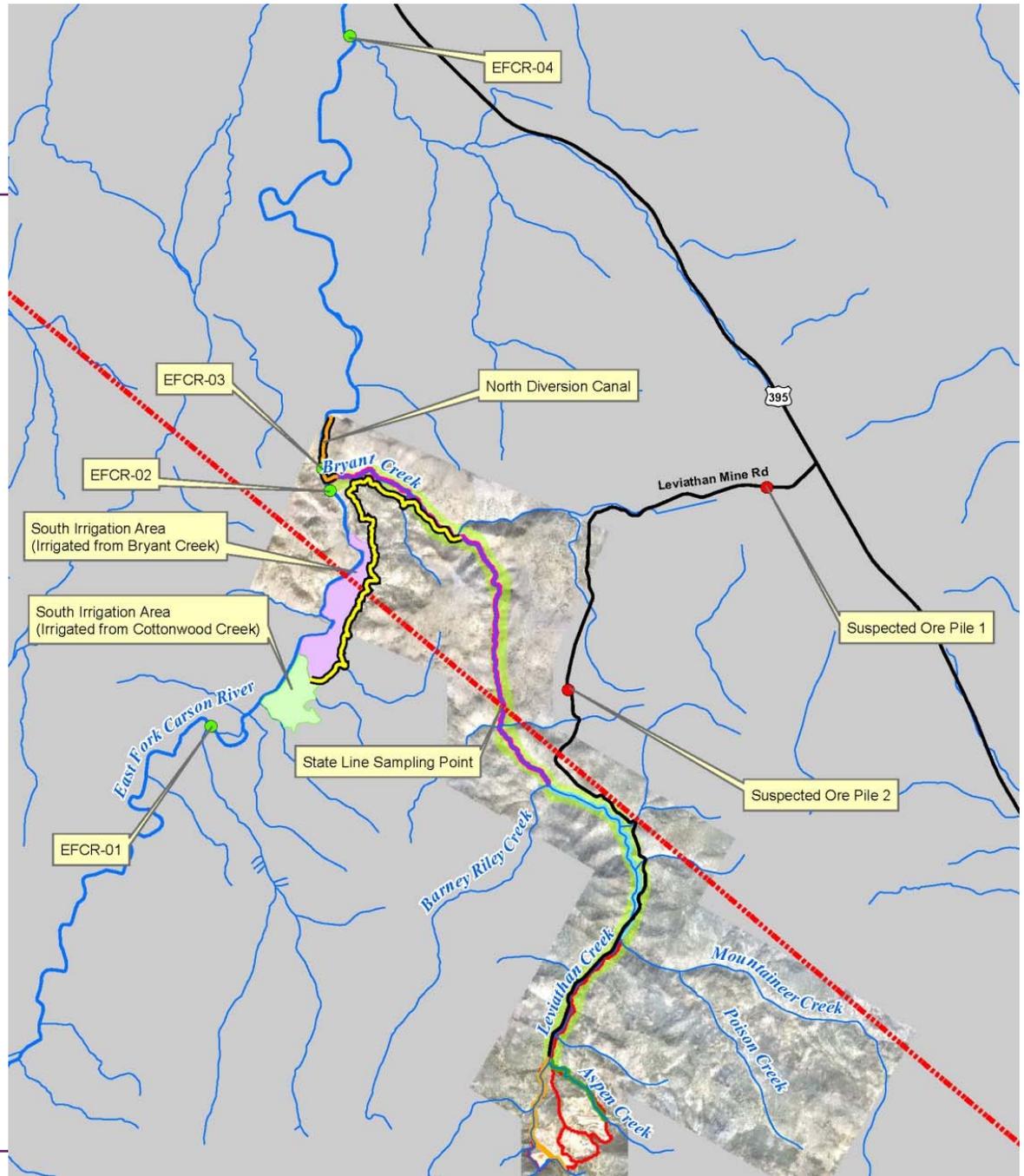
- ▶ Downstream Study Area
- ▶ Supplemental Study Areas



Study Areas

Supplemental Study Areas

- ▶ East Fork Carson River
- ▶ River Ranch
- ▶ Suspected Ore Piles
- ▶ Leviathan Mine Road



On-Going Monitoring Activities

Groundwater

Surface Water and AD Discharge Locations

Meteorological Stations and Evaporation Pans

Storm Water and Snowmelt Runoff

Beaver Pond Surface Water

Upper Tributary Weirs, Piezometers and Drive-Point Piezometers

Other Activities

Well Development

Piezometer Rehabilitation

Hydraulic Testing

Mine Waste Characterization

River Ranch Irrigation System and Soils Mapping

Leviathan Mine Road Reconnaissance

Interim Combined AD Treatability Investigation

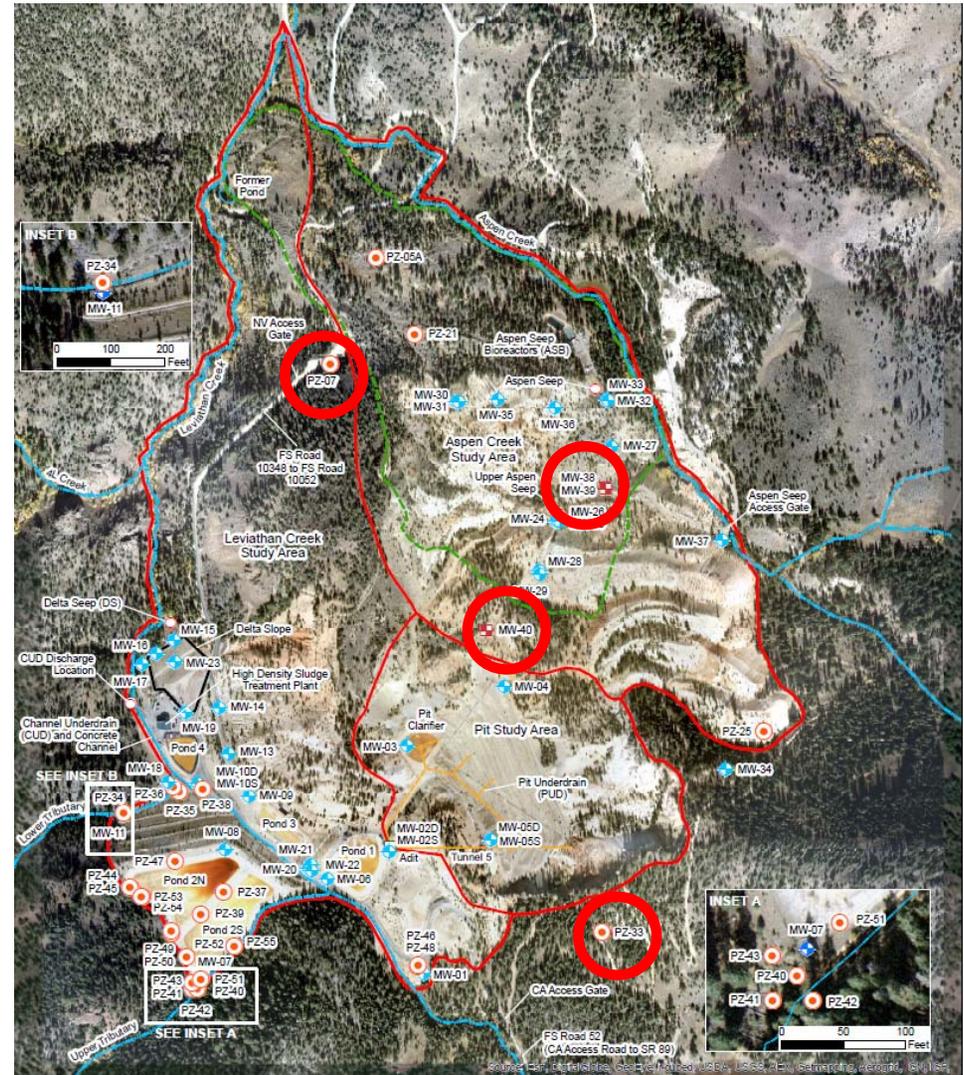
Well Development & Piezometer Rehabilitation

Two monitoring wells installed in 2013 developed:

- ▶ MW-38
- ▶ MW-40

Two 1980s USGS-installed piezometers rehabilitated:

- ▶ PZ-07
- ▶ PZ-33



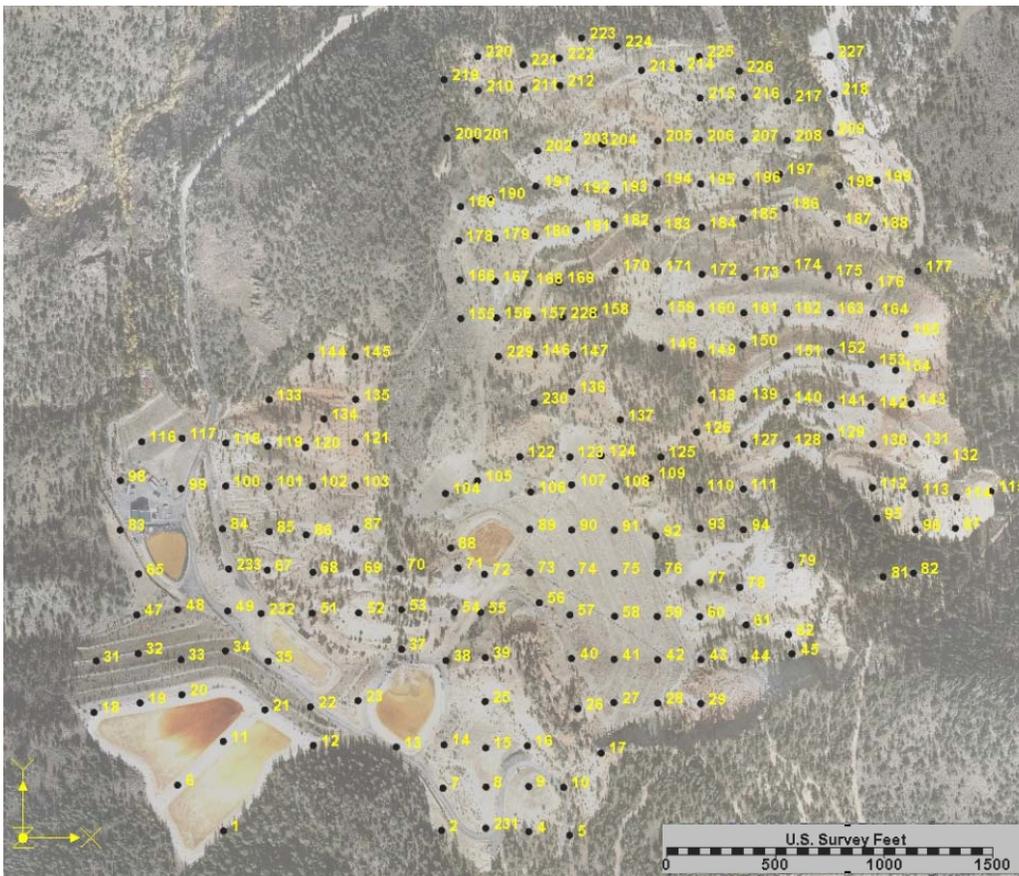
Well Development & Piezometer Rehabilitation



Mine Waste Characterization – FPXRF Survey

Characterize distribution and spatial variability of select metals:

- ▶ Grid with ~200-foot spacing
- ▶ Locations adjusted in field as needed resulting in 230 sample locations
- ▶ Samples collected at two depths
 - ▶ ~ 0 to 0.5 feet
 - ▶ ~ 1.5 to 2 feet
- ▶ 460 samples total
- ▶ Samples screened for metals with FPXRF analyzer
- ▶ Results used to design program to collect samples for laboratory analysis



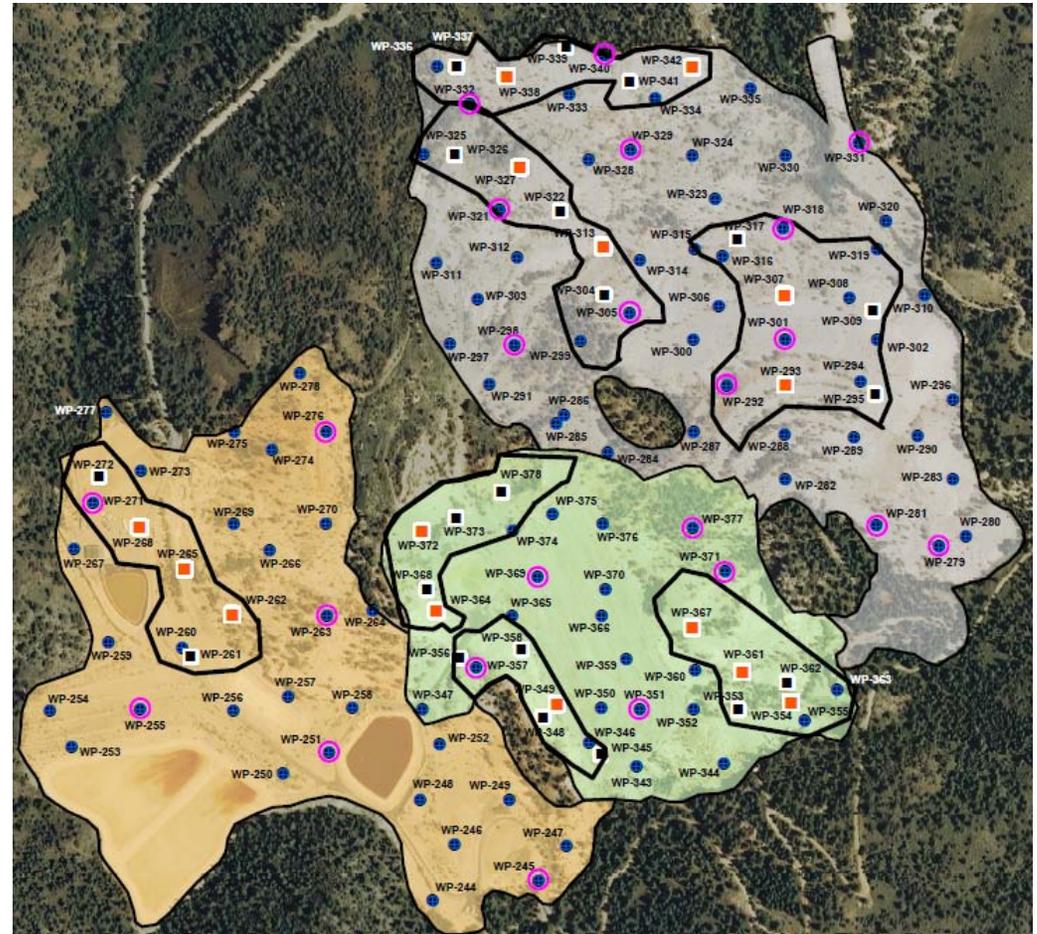
Mine Waste Characterization – Sampling and Laboratory Analysis

Discrete soil samples collected from 115 locations:

- ▶ Approximate 400-foot spacing
- ▶ Samples collected at two depths:
 - ▶ ~ 0 to 0.5 feet
 - ▶ ~ 1.5 to 2 feet
- ▶ 230 samples total
- ▶ Analyzed for RI/FS metals, TOC, and grain size

Additional composite samples collected in 7 areas:

- ▶ 14 samples analyzed for acid-generating potential
- ▶ 7 samples analyzed for metals solubility



Mine Waste Characterization – FPXRF Survey



Leviathan Mine Road – Reconnaissance Mapping



Reconnaissance Mapping

- ▶ Leviathan Mine Road from Highway 395 to State Route 89
- ▶ Consistency of geologic materials
- ▶ Other visual evidence such as staining or vegetation patterns

River Ranch Irrigation Systems and Soil Mapping

In progress:

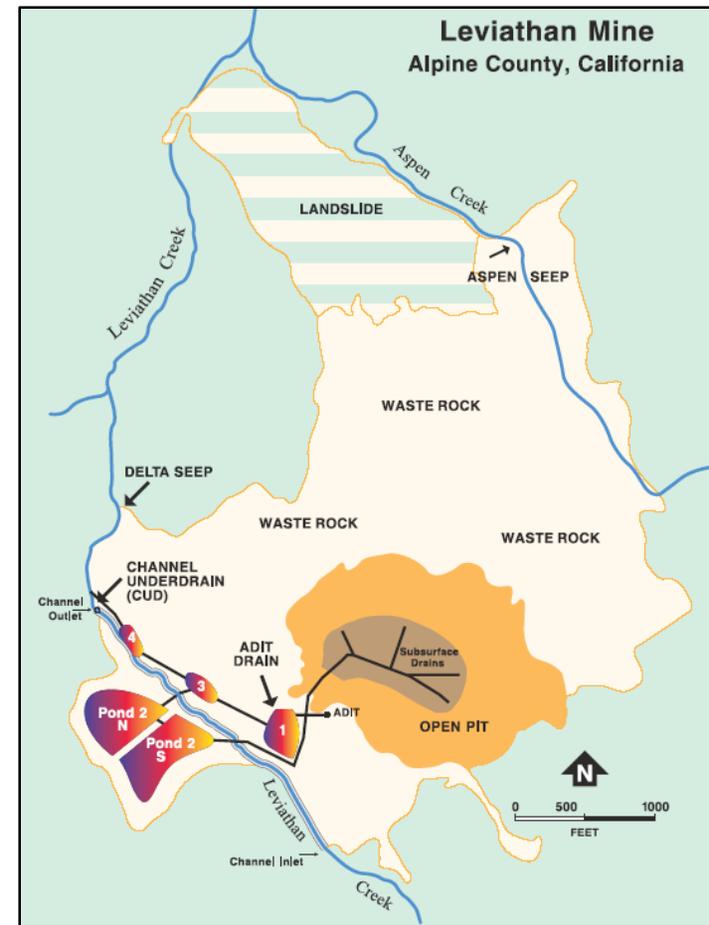
- ▶ Map diversion ditches and structures
- ▶ Identify extent of irrigation areas based on topography and probable flow paths
- ▶ Map major soil depositional features



Interim Combined AD Treatability Investigation

Primary objectives of the treatability study:

- ▶ Evaluate the effectiveness and efficiency of HDS treatment technology to treat the primary AD discharges (CUD, DS, AS, PUD, and Adit) at the site.
- ▶ Evaluate the adequacy and sizing of the HDS Treatment System to handle flows from the combined AD discharges under reasonably anticipated discharge rate scenarios.
- ▶ Evaluate the chemistry and classification of sludge resulting from HDS treatment of the AD discharges at the site.
- ▶ Evaluate HDS Treatment System operations and maintenance costs associated with combined treatment of the AD discharges at the site.
- ▶ Evaluate the technology needed for collecting and conveying AD from the various discharge points to the HDS Treatment system.



Interim Combined AD Treatability Investigation

Bench-Scale Testing:

- ▶ Source Mixing / Aging Evaluation
- ▶ Lime Utilization Test
- ▶ Solids Generation/Composition Test
- ▶ Scaling Potential Test
- ▶ Discharge Compliance Test
- ▶ Flocculant Bench Test
- ▶ Substitution Test

Pilot-Scale Testing:

- ▶ Phase I – 100% Pond 4 (CUD/DS) – used to verify pilot plant performance
- ▶ Phase II – 40% Pond 2S (PUD/Adit) and 60% Pond 4 – simulated a “real world” scenario for interim combined treatment during the 2014 drought treatment season
- ▶ Blend III – 14% Pond 2S and 86% Pond 4 – simulated average water year for interim combined treatment and long term remedy scenarios

HDS Treatment Plant Capacity Testing

- ▶ Began testing at 100 gpm and continually increased the flow rate at 10 gpm increments
- ▶ Allowed 2 to 3 hours and verification of steady-state operations before each flow rate increase

Interim Combined AD Treatability Investigation



Interim Combined AD Treatability Investigation



On-Property FRI Data Collection

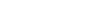
On-Property RI/FS Tasks		Data Collection Activity											
		Mapping/Field Verification	Geophysics	Drilling/Well Installation	Groundwater Monitoring	Mine/Site Features Evaluation	Soil Sampling	Meteorological Monitoring	Surface Water Monitoring	Stream Sediment Sampling	Storm Water and Snowmelt Monitoring	Plant Sampling	Fish/Habitat Surveys and Sampling
Hydrogeologic Investigations		X		2015-2016	2015-2017		2015-2016						
Source Investigations	Mine Waste	X					X						
	Acid Drainage		X	2015-2016	2015-2016	X	2015-2016	2015-2016	2015-2017				
	Floodplain Soil	X					2015-2016						
	Air	X					X	2015-2016					
Water Balance Studies		X						2015-2016	2015-2017				
Surface Water Investigations		X							2015-2017				
Stream Sediment Investigations		X								2015-2016			
Bioassessment Investigations		X					2015		2015-2017	2015-2016		2015	2016
Storm Water and Snowmelt Runoff Investigations		X						2015-2016			2015-2017		

Preliminary estimated completion dates (subject to change)

- Completed (for select activities assumes 2 years sufficient)
- In Progress
- Not Started

Off-Property FRI Data Collection

Off-Property RI/FS Tasks	Data Collection Activity					
	Mapping/Field Verification	Soil Sampling	Surface Water Monitoring	Stream Sediment Sampling	Plant Sampling	Fish/Habitat Surveys and Sampling
Downstream Study Area						
Surface Water Investigations	X		2015-2017			
Stream Sediment Investigations	X			X		
Floodplain Soil Investigations	2016	2016				
Bioassessment Investigations	X	2015	2015-2017	X	2015	2016
Supplemental Study Areas						
Surface Water Investigations			X			
Stream Sediment Investigations				X		
Bioassessment Investigations			X	X		
Soil Investigations	2015	2015-2016				

 Preliminary estimated completion dates (subject to change)
 Completed (for select activities assumes 2 years sufficient)
 In Progress
 Not Started

Reference FRI Data Collection

Reference RI/FS Tasks	Data Collection Activity							
	Mapping/Field Verification	Drilling and Well Installation	Groundwater Monitoring	Soil Sampling	Surface Water Monitoring	Stream Sediment Sampling	Plant Sampling	Fish/Habitat Surveys and Sampling
Surface Water Investigations	X				2015			
Stream Sediment Investigations	2015					2015		
Floodplain Soil Investigations	2015			2015				
Bioassessment Investigations	X			2015		2015	2015	2016
Groundwater Investigations	X	2016	2016-2017					
Soil Investigations	2015			2015				

Preliminary estimated completion dates (subject to change)

	Completed
	In Progress
	Not Started

Feasibility Study Activities

Subject Category	White Papers / Engineering Evaluations	Field Data Collection	Treatability Studies	FS Report Preparation
Geotechnical Characterization	2014-2015	2015-2018		2019
Source Water Controls	2014-2016		2015-2019	
AD Capture & Conveyance	2017	2017-2018		
AD Treatment	2015-2018		2014-2018	
Sludge Management	2015-2018		2016-2018	
Site Access	2015-2016			
Site Utilities	2016-2018			

Preliminary estimated completion dates (subject to change)

	Completed
	In Progress
	Not Started

Moving Forward in 2015 – RI Documents

On-Property FRI Work Plan

- ▶ Amendment No. 8 – U.S. EPA review/approval pending
- ▶ Amendment No. 9, Revision No. 1 – January 30
- ▶ Amendment No. 10 – U.S. EPA review/approval pending

Off-Property FRI Work Plan

- ▶ River Ranch TSAP for detailed sampling

Reference Area Work Plan

- ▶ Revised work plan – February 28

RI Reporting

- ▶ Evaluation of Historical and RI/FS Surface Water Data, Revision 1 – January 30
- ▶ East Fork Carson River Report – January 30
- ▶ Revised ERA Work Plan – January 30
- ▶ Updated DQOs and Cross-Reference Matrix – February 28
- ▶ 2014 RI/FS Data Summary Report and Database Update – estimated Third Quarter

Risk Assessment – Next Steps

Human Health Risk Assessment

- ▶ Resolution on Washoe Tribe exposure scenario – meeting with tribe January 21
- ▶ Update work plan – include Washoe Tribe exposure scenario and other changes since 2010
- ▶ Evaluate data sets for use in risk assessment (as appropriate)

Ecological Risk Assessment

- ▶ Revised work plan – January 30
- ▶ Evaluate data sets for use in risk assessment (as appropriate)

Moving Forward in 2015 – FS Documents

FS Approach Letter – U.S. EPA Approval Pending

Site Specific Field Data Collection

- ▶ Geotechnical Characterization Work Plan

Site Specific Treatability Studies

- ▶ Revegetation Treatability Study Work Plan

Treatability Study Results

- ▶ Interim Combined AD Treatability Investigation Report

Moving Forward in 2015 – Tentative RI Field Activities

On-going Monitoring Programs

- ▶ Groundwater
- ▶ Upper Tributary Groundwater and Surface Water
- ▶ Meteorological Conditions
- ▶ Surface Water (select locations)
- ▶ Surface Water AD discharge (select locations)
- ▶ Storm Water and Snowmelt Runoff (select locations)

Stream Sediment and Floodplain Soil in Beaver Dam/Pond Complex

Drilling and Well Installation

Plant/Soil Sampling (all study areas)

Installation and Monitoring of Storm Water Stations in ACSA

Surface Water Mapping and Sampling – Doud Springs/Lower Bryant

River Ranch Mapping and Soil Investigation

Soil, Floodplain Soil, Surface Water, and Stream Sediment – Reference Area

Moving Forward in 2015 – Tentative FS Field Activities

Site Specific Field Data Collection

- ▶ Geotechnical Characterization
 - ▶ Field Implementation
 - ▶ Initial Monitoring

Site Specific Treatability Studies

- ▶ Revegetation Treatability Study
 - ▶ Field Implementation
 - ▶ Initial Monitoring